AGRC E911 Annual Report (9/05/08)

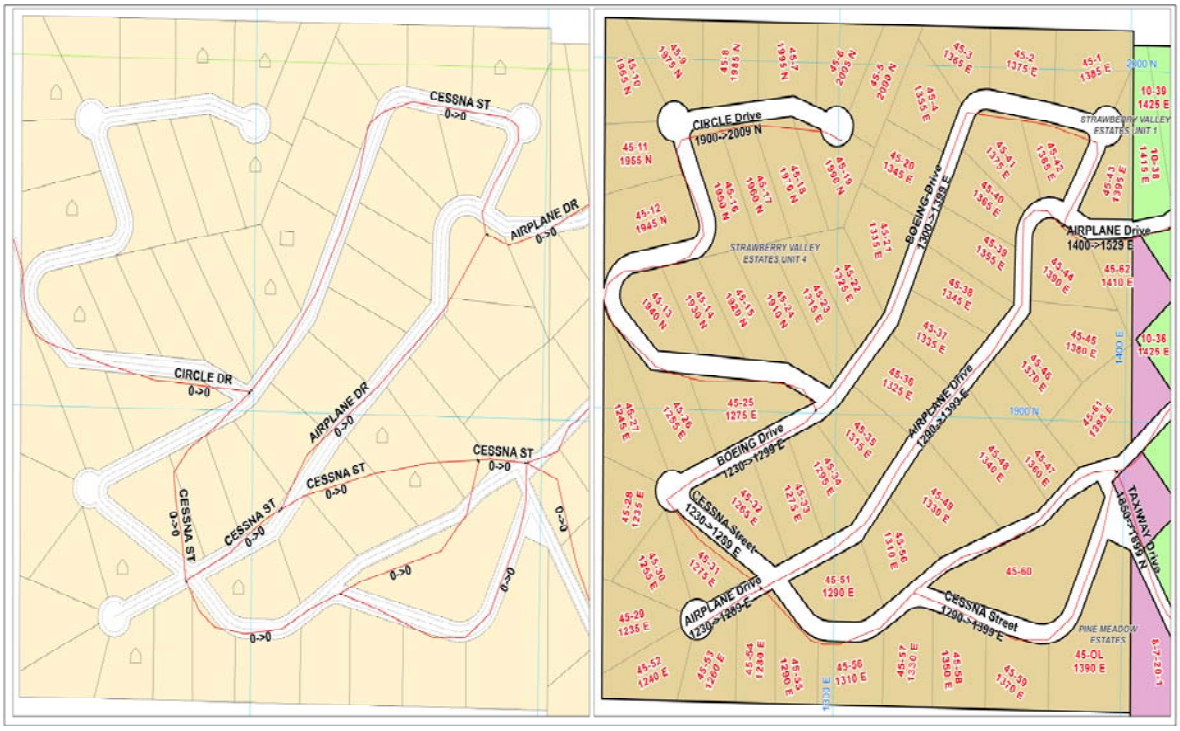
INTRODUCTION

The fourth year of geospatial technical support for E911 implementation, funded by the State Legislature, has now been completed. In the past year, AGRC has addressed an additional 4,275 miles of roads in the State Geographic Information Database (SGID) thereby increasing the total number of Utah roads carrying address attribution to 25,105 miles. A variety of other activities have been accomplished with the focus on fifteen county Public Safety Answering Points (PSAPs), the Navajo and Uintah-Ouray Reservations, and the UDOT Traffic Operations Center. Details for each of these areas can be found at the end of the AGRC Report.

The goal has been to cooperatively develop and share the best (most accurate, current, and complete) information about the State's transportation/address infrastructure. It has been agreed formally through statute and in practice, that the State Geographic Information Database (SGID), managed by the Automated Geographic Reference Center (AGRC), is the central clearinghouse for standardized digital transportation and address data for local, state, federal and tribal agencies in Utah. AGRC, working with local, state, tribal and federal agency partners, is creating an accurate representation of the transportation infrastructure for the approximately 100,000 miles of roads in Utah.

Integration of parcels, boundaries, and streets into a comprehensive database of centerlines and addresses is a very complex activity. The graphic below depicts a small section in Kane County illustrating the results of translating existing CAD data into a GIS and working with local officials to develop accurate and complete parcel, street, and address data.

Strawberry Valley Estates, Unit 4
Duck Creek, Cedar Mountain, Utah



BEFORE AFTER

The original legislation stated:
53-10-605. *(1) Subject to an annual legislative appropriation from the fund to:*
(c) the state's Automated Geographic Reference Center in the Division of Information Technology Services, an amount equal to 1 cent per month levied on telephone services under Section 69-2-5.6 shall be used to enhance and upgrade statewide digital mapping standards.

Based on discussions with the E911 Committee, PSAP managers, and county employees, the following activities have been conducted with the appropriated funds:

- GPS road centerline data collection
- Field verification on road centerlines to ensure correct & complete address calibration
- Inspection and quality assurance to ensure correct & complete address calibration
- Topology (connectivity and contiguity to define and enforce data integrity)
- Geocoding attribute Quality Control and problem reporting
- Address grid creation and assistance
- Assistance and design of linear referencing systems
- Assistance and development of road naming conventions and standards
- Structure address numbering assistance
- Assistance with road sign location and style for addressing for E911 purposes
- Master Street Address Guide (MSAG) generation
- Map creation for planning and public meetings
- Meetings between neighboring counties to reconcile road name differences
- Other necessary support that may be defined by the PSAP
- Wireless cell tower coverage mapping

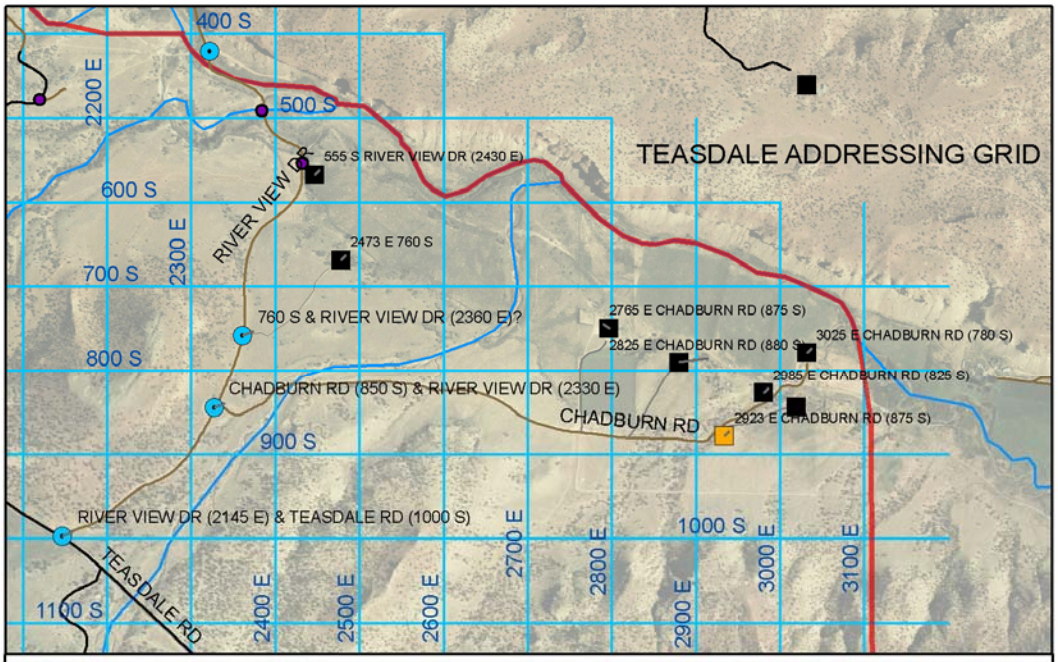
APPROACH

AGRC's approach is multi-faceted and can be categorized into 9 distinct functions: 1 through 5 being the priorities for 2007 and 2008.

1) **County and PSAP support**. AGRC meets with county leaders including commissioners, sheriffs, emergency services, PSAP operators and dispatchers, road department, recorders, assessors, and surveyors and the GIS coordinators. Technical support is provided for centerline creation which includes location and digitizing of roads; developing and implementing road naming conventions, standards, and rules; determining and populating other road name aliases along with the creation of the MSAG (see example below); addressing and grid generation; identifying a center of origin and block size to suit the county; linear referencing systems; helping to determine signage locations, number of signs, and sign text.

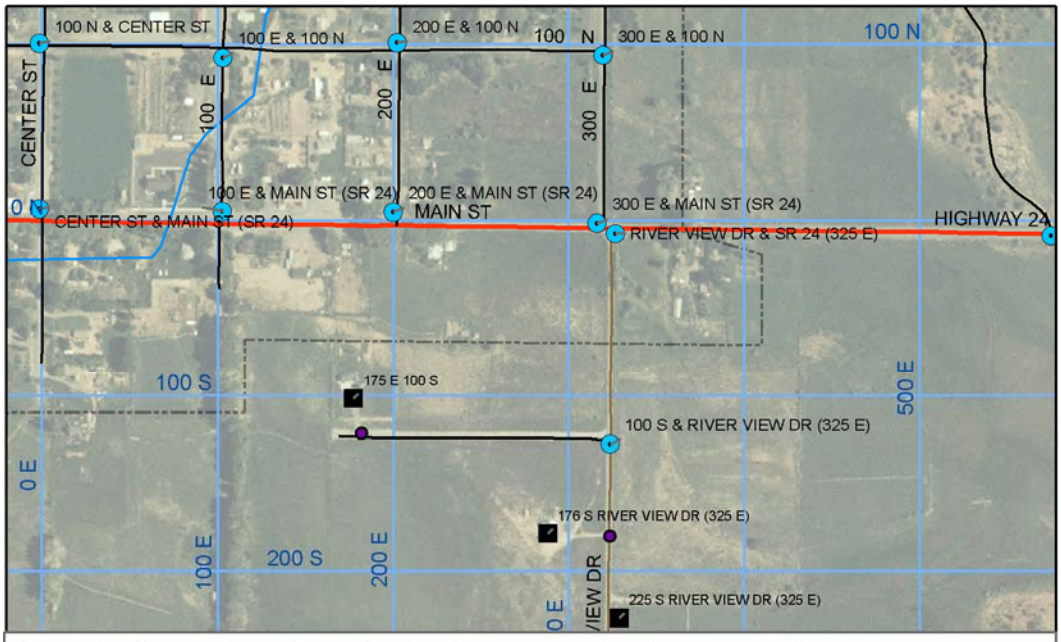
The Master Street Address Guide (MSAG) can be generated out of the geospatial database for formatting and migration into the ALI/ANI software used by the PSAP. (Partial example from Big Water grid illustrated below)

E,AMERICAN WAY,,950,1299,BIG WATER,9999
E,ARLINGTON DR,100 N,1,99,BIG WATER,9999
E,BALD EAGLE DR,,1020,1119,BIG WATER,9999
E,BRANDYWINE DR,200 N,1,99,BIG WATER,9999
E,CANNONBALL DR,,800,929,BIG WATER,9999
E,CONCORD BRIDGE DR,300 N,1,99,BIG WATER,9999
E,DRY POWDER DR,400 N,1,99,BIG WATER,9999
E,HAWKINS DR,500 N,1,99,BIG WATER,9999



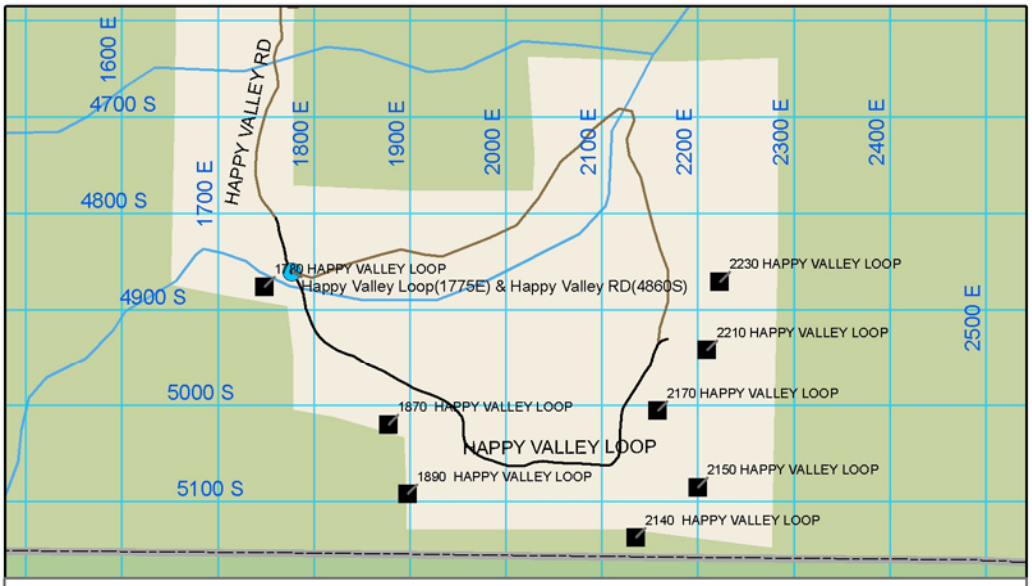
Teasdale addressing grid: Blue circles are road signs, Black squares are homes. The bold Red line is the boundary between Teasdale and Torrey grid , it was adjusted to follow along the river, instead of along section lines, to beter serve the area.

Example #1 shows an address grid system in a typical rural area. Multiple grid areas are defined per county to reflect current addressing schemes and other considerations that include place names, roads, phone prefix number areas, zip code boundaries, and local preferences.



Example of where the existing Road address are used and any new address are adjusted according to the new grid . Blue dots are signs, Black squares are homes. Blue lines and numbers are the addressing grid and values

Example #2 illustrates the address grid system, and sign location and text.



Example of Addressing on a Loop road, keeping the values increasing to the east. The Black part of the road is the established area, the Brown is not improved yet. Black squares are homes, Blue Circles are signs and the Blue lines and values are the grid.

Example #3 shows how a loop road in a typical rural area is addressed to take advantage of the newly developed grid system.

2) **E911 Committee Support.** AGRC also supports the E911 Committee by developing products including PSAP status map and cell phone provider coverage areas. AGRC also produces maps showing grant amounts for PSAPs and other products the committee requests.
3) **Urban areas data**. Initially, the focus has been to complete and provide quality control for centerlines/addresses in urban areas where most of the state's population is. This includes examples like Salt Lake County where AGRC integrates data from multiple sources including VECC, Salt Lake City, Sandy City and Salt Lake County to develop a comprehensive standardized data set. It also includes rural counties where AGRC is doing the field work for creation of GPS centerlines and calibration of address from field observation of signs and house numbers. This process often includes AGRC, the county, various cities, Blue Stakes, the Bureau of Census, Utah Department of Transportation, and the Division of Emergency Services.
4) **Rural populated areas data**. The next focus is the rural areas of the counties typified by farms, ranches and small subdivisions. These areas typically do not have addressing schemes or, have very sporadic and non-standardized addresses. AGRC is working with each county to develop a rural addressing scheme that makes sense for their geography (see examples above). We also work with neighboring counties to ensure connectivity for both road centerline and descriptive attributes are accurate and logical. AGRC is also engaged in an activity initiated by the Canyon Country Partnership to compare names and numbers of roads crossing county boundaries and solve discrepancies to limit issues for dispatchers.

5) **Public lands data**. The Canyon Country Partnership activity identified above is focusing on Class B roads many of which are on public lands. AGRC and CCP have worked with the BLM and Forest Service to solve these naming issues. The Federal Communications Commission (FCC) requires wireless communications providers Automatic Location Identification (ALI) functionality. Acquisition of road centerlines across public lands using GPS technology has been a several year effort. It is near completion, but developing addressing schemes for these roads was not done. Roads traveling outside of towns are only partially addressed. Roads traveling across public land typically have no address ranges but may have names in the GIS database. We are now working with individual counties and the public land management agencies to develop grid systems or linear reference systems for these areas. Most rural counties have now met with neighboring counties to agree on common standardized names for roads crossing county boundaries.
6) **Provide base data for Homeland Security and Public Safety:** Geographic Information Systems and data are essential to Utah's Homeland Security initiative, serving as the framework for vulnerability assessment, preparedness planning, and response and recovery. The GIS Advisory Committee, working with the Department of Public Safety and the Office of the State's Chief Information Officer, is taking the lead on insuring the most accurate, current, and detailed data is available. This group will lead in identification of transportation vulnerabilities to intentional disruption. The transportation data in the SGID is now routinely used for Homeland Security planning and response exercises and other activities, including the Child Abduction Response Team (CART).
7) **Processes for long term maintenance**. AGRC is working with each county, UDOT and federal agencies to determine best practices for each area to keep the data current. As more accurate data becomes available for a particular road segment or as new road segments are developed, a process must be in place to update the SGID, the PSAP data, and other databases requiring centerline / address information.
8) **TIGER modernization**. The Census Bureau initiated a process to increase the accuracy and currency of their TIGER database. TIGER is the data used for redistricting and many federal programs requiring classification by population or demographic characteristics. Their goal is to have the entire nation's transportation base revised by 2008. They intend to use state and local data where it exists. Census was able to get road centerline data directly from most counties. AGRC provided technical assistance where required. Census will include all road centerline data in TIGER when complete. Since some PSAPs use commercial centerline datasets derived from TIGER, it is in the State's best interest to make sure TIGER is as accurate as possible. Only Utah and Davis Counties have completed this process with all counties in Utah scheduled to by done by early-2009.
9) **Provide access to the data**. The Utah State Legislature established the SGID in 1991 with the intent to serve as a repository and clearinghouse, and provide standards for data acquired in the State. All non-sensitive data in the SGID is publically accessible over the World Wide Web. Utah also coordinates with national activities including Geospatial One Stop (GOS) and the National Map (TNM). The GOS vision of the Federal Geographic Data Committee and the

U.S. Office of Management and Budget is to "revolutionize e-government by providing a geographic component". This initiative will contribute to Utah's transportation data activities by developing and implementing data standards, maintain an inventory of data, publish metadata for planned data acquisition and update activities, prototype and deploy web mapping services, establish a federal portal to national data resources. The National Map, initiated by the US Geological Survey, will develop a national database for framework layers including transportation. This database will be the primary source for all federal agency geographic information needs. All transportation / address data developed in support of E911 will be available through these state and national data portals.

This approach implemented through performing the activities identified in the Introduction section of this report have resulted in a tremendous amount of standardized data to support E911 needs in the state and many other state and local activities benefiting the citizens of Utah.

CURRENT STATUS

In this section, we will list overall activities, priorities and summarize the activities in each county.

Daggett

2008 Accomplishments:

- AGRC provided Keri Pallesen (County Auditor/Recorder) technical assistance with the proper format of Daggett County's E911 grant proposal. The E911 Committee approved the proposal on August 21, 2008.
- AGRC completed a preliminary GIS dataset of cell tower coverage areas in the Uintah Basin. AGRC will present the results to the E911 Executive Committee for input and further direction on the project.

Duchesne

2008 Accomplishments:

- Throughout Duchesne County, AGRC GPS'd approximately 146 miles of street centerlines, digitized 164 miles of street centerlines, and GPS'd approximately 743 (plus 1040 on the Uintah-Ouray Reservation) structure locations to support the addressing effort in the Fruitland area.
- In Fruitland and the area between Fruitland and Starvation Reservoir, AGRC calibrated the address of each structure location. The end product improves the geocoding result and provides a more accurate, current, and complete GIS database to support E911 activities.
- Duchesne County estimates that about 90% of its relevant roadways in the Fruitland area are now represented in the GIS database.
- AGRC collected approximately 280 GPS point locations of oil and gas developments to support emergency response and land use planning by the Duchesne County Commission.

- AGRC completed a preliminary GIS dataset of cell tower coverage areas in the Uintah Basin. AGRC will present the results to the E911 Executive Committee for input and further direction on the project.

Garfield

2008 Accomplishments:

- AGRC completed the address calibration process in the GIS database for the Boulder, Cannonville, Escalante, Henrieville, Hatch, and Ticaboo areas with the aid of plat maps and information provided in the tax assessment records database.
- To support the Richfield Communication Center, AGRC created a new address grid for Antimony, collected GPS street centerlines, digitized approximately 102 address point locations, completed the address calibration process, and populated the structure locations with the new address and owner name in the GIS database.
- AGRC collected GPS street centerlines in the Mammoth Creek area and field checked the street centerlines not visible in the aerial imagery to ensure the GIS database is complete and accurate.

Grand

2008 Accomplishments:

- AGRC provided Dave Vaughn, Grand County GIS/Road Department, with GIS technical assistance and field verification to improve geocoding match rates to support E911 related activities.
- AGRC corrected all possible data validation errors in Grand County's GIS street centerline database. The remaining errors require decisions that will need to be addressed by Grand County authorities.
- AGRC is in the process of comparing the MSAG (Master Street Address Guide) to the GIS database to identify and correct street name and address range errors. Resources from Dave Vaughn, the County Recorder, plat maps, and parcel data are being used to help with the addressing effort.
- AGRC collected GPS street centerlines in the Moab area to ensure the GIS database is complete and accurate.

Juab

2008 Accomplishments:

- AGRC created a new address grid for Snake Valley, completed the address calibration process in the GIS database, and assigned an address to each GPS structure point.
- Juab County provided AGRC with a street centerline update of the Nephi area. AGRC integrated the update into Juab County's GIS database that will be used to support E911 related activities.
- AGRC generated a MSAG from the GIS database for the Snake Valley area and provided it to Glenn Greenhalgh, Juab County Economic Development/GIS.

Kane

2008 Accomplishments:

- AGRC completed the address calibration process in the GIS database for the Alton, Big Water, Glendale, and Orderville areas.

- AGRC completed the address calibration process in the Duck Creek area, populated approximately 3,900 parcels with a house number and address, and populated approximately 7,700 parcels with the parcel ID, subdivision name, and serial number in the GIS database.
- With the exception of the streets named *Vermilion* and *Vermillion* (two with 2 "L"'s and 2 with 1 "L") in the Kanab municipality, all duplicate road name issues have been resolved in Kane County.
- Kane County needs to resolve address change issues in the municipalities of Orderville, Alton, and Glendale.
- To support the PSAP in Page, Arizona, AGRC generated a MSAG from the GIS database for the Big Water area.
- On September 2, 2008, Kane County held a public hearing to discuss the address changes that were made in the Duck Creek area. The outcome of the meeting will determine the volume of changes to be made in the GIS database.
- After the Alton, Duck Creek, Glendale, and Orderville areas are finalized, AGRC will begin the initial address calibration process in the Kanab area.
- Cannonville and Bullfrog are relatively small and will not require much time to complete the address calibration process.

Millard

2008 Accomplishments:

- To improve geocoding results in support of E911 related activities, AGRC made field observations to determine address ranges, street names, and prefix/suffix directions on street centerlines traveling on the outskirts of Fillmore.

Morgan

2008 Accomplishments:

- To improve geocoding results in support of E911 related activies, AGRC made field observations to determine address ranges, street names, and prefix/suffix directions on street centerlines in the Mountain Green area.

Navajo Nation

2008 Accomplishments:

- AGRC provided the Navajo Nation technical assistance with the proper format of a MOU agreement between AGRC, San Juan County, UT, and the Navajo Nation. When the MOU agreement is finalized, AGRC will coordinate with the Navajo Nation in the collection of GPS road centerlines and structure locations to enhance the GIS database and to support the addressing effort.

Piute

2008 Accomplishments:

- To support the addressing effort, AGRC digitized and collected GPS street centerlines that were not visible in the aerial imagery. In addition, approximately 860 structure locations were either digitized or GPS'd.
- AGRC completed the address calibration process in the Angle, Circleville, Kingston, Greenwich, Marysvale, Junction, and Otter Creek areas in the GIS database.

- With coordination from county personnel, city mayors, and local residents, AGRC assigned each structure location a new address, owner name, and parcel ID number in the GIS database. A few of the original addresses throughout the county were not changed because they corresponded to the new address grid system. The end product improves the geocoding result and provides a more accurate, current, and complete GIS database to support E911 activities.
- AGRC coordinated with Piute County, Bureau of Land Management, and Fishlake National Forest to ensure roads that cross multiple jurisdictional boundaries are named consistently.
- AGRC assisted Piute County in notifying each town of the street name changes that will need to be reflected on the new road signs.
- AGRC generated a MSAG from the GIS database and provided it to Jeff Nielson, Richfield Communications Center.

Rich

2008 Accomplishments:

- AGRC digitized and collected GPS street centerlines in new subdivisions and on major highways. Address ranges and street names from plat maps were then incorporated into the GIS database.
- AGRC compared the GIS database to the MSAG to identify and correct street name and address range errors. Resources from plat maps and parcel data were used to help with the effort.
- AGRC completed the address calibration process in the GIS database for the Garden City, Laketown, Randolph, and Woodruff areas with the aid of plat maps and information provided in the tax assessment records database.
- AGRC provided Debra Ames, County Recorder/GIS, the final GIS database to be used by the Rich County PSAP.
- AGRC provided Debra Ames GIS technical support to complete the Local Update of Census Addresses (LUCA).

San Juan

2008 Accomplishments:

- In the GIS database, AGRC attributed San Juan County's B road system with address ranges calibrated in miles. This will be a valuable tool to the San Juan County PSAP when determining the best route to and approximate location of an emergency in a remote area.
- In total, AGRC digitized or GPS'd approximately 238 structure locations throughout San Juan County to support the addressing effort.
- For the White Mesa Reservation, AGRC collected GPS street centerlines and structure locations, completed the address calibration process, and assigned new addresses to the existing structures. The addressing effort will be official when White Mesa Reservation officials and San Juan County approves the new system.
- AGRC completed the address calibration process in the GIS database for the Monticello area.
- AGRC will meet with San Juan County to finalize the address calibration process in the Blanding area.

- AGRC collected GPS street centerlines and structure locations in the Wilson Arch and Westwater areas. To complete the address calibration process for these areas, AGRC will meet with San Juan County officials to incorporate street names and assign new addresses in the GIS database.
- AGRC collected GPS street centerlines and structure locations in the Natural Bridges National Monument area. To complete the address calibration process, AGRC will meet with Monument officials to incorporate road names and assign new addresses in the GIS database.
- San Juan County officials are contacting the representative for the Blue Mountain Ranch area to obtain input on the address calibration process. AGRC will coordinate with the representative and San Juan County during the address calibration process.
- San Juan County officials are in the process of assigning road names in the Halchita area. Once complete, AGRC can begin the address calibration process and assign new addresses to structure locations as needed.
- AGRC is currently in the process of completing the final draft version of San Juan County's ESZ (Emergency Service Zone) boundaries in the GIS database. When complete, the ESZ boundaries will be provided to the San Juan County PSAP.

Sevier

2008 Accomplishments:

- In the Richfield area, AGRC collected GPS street centerlines, digitized approximately 2330 structure locations, and verified addresses in the field to support the addressing effort.
- AGRC digitized approximately 295 structure locations in the Redmond area to support the addressing effort.
- AGRC populated the structure locations in the Richfield and Redmond areas with the address, owner name, and parcel ID within the GIS database.
- AGRC is currently in the process of verifying the GIS database with a list of addresses provided by the Recorder's Office to ensure for accuracy and completeness.

UDOT Traffic Operations Center (UTOC)

2008 Accomplishments:

- AGRC met with UTOC officials and Spillman to discuss the processes involved and requirements when loading the street centerline data into the PSAP.

Uintah

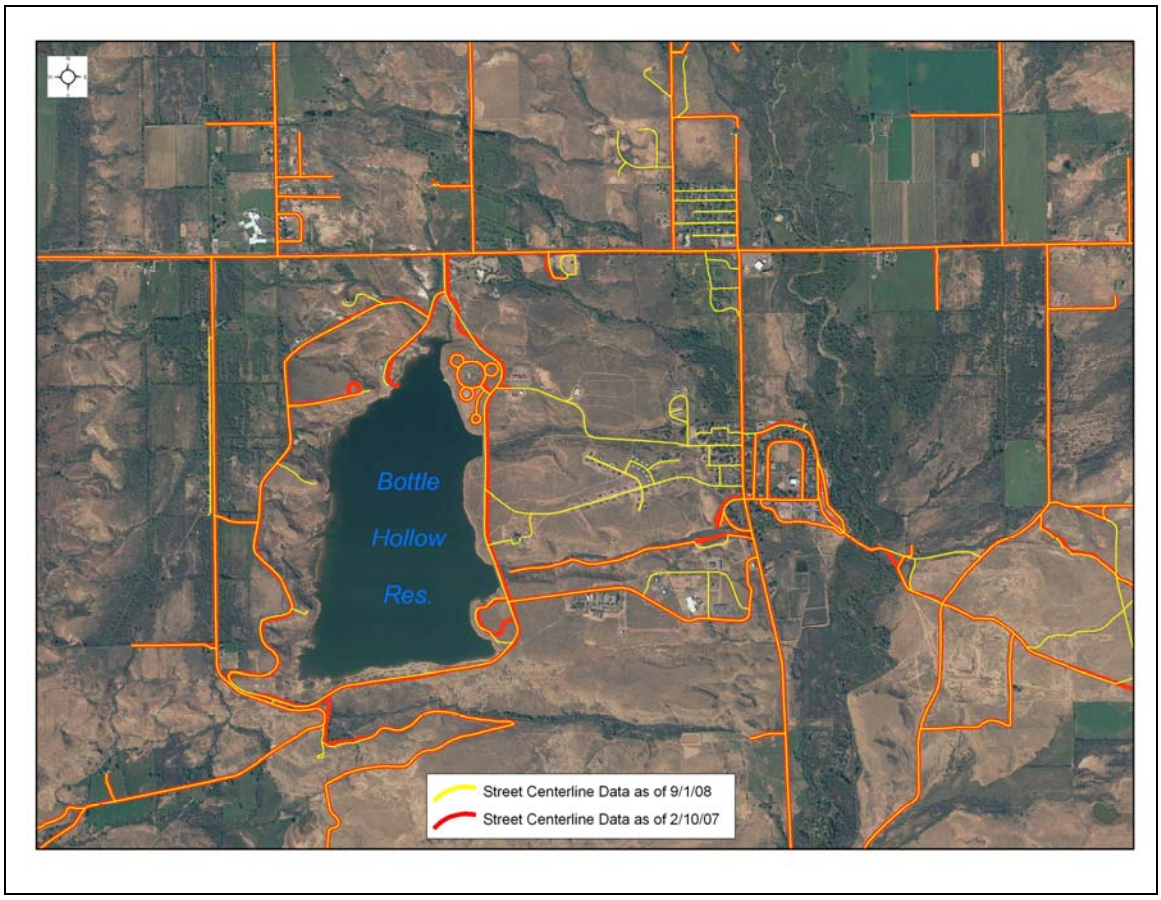
2008 Accomplishments:

- AGRC completed a preliminary GIS dataset of cell tower coverage areas in the Uintah Basin. AGRC will present the results to the E911 Executive Committee for input and further direction on the project.
- AGRC collected approximately 244 GPS structure locations on the Uintah-Ouray Reservation to support the Uintah-Ouray Reservation addressing effort.

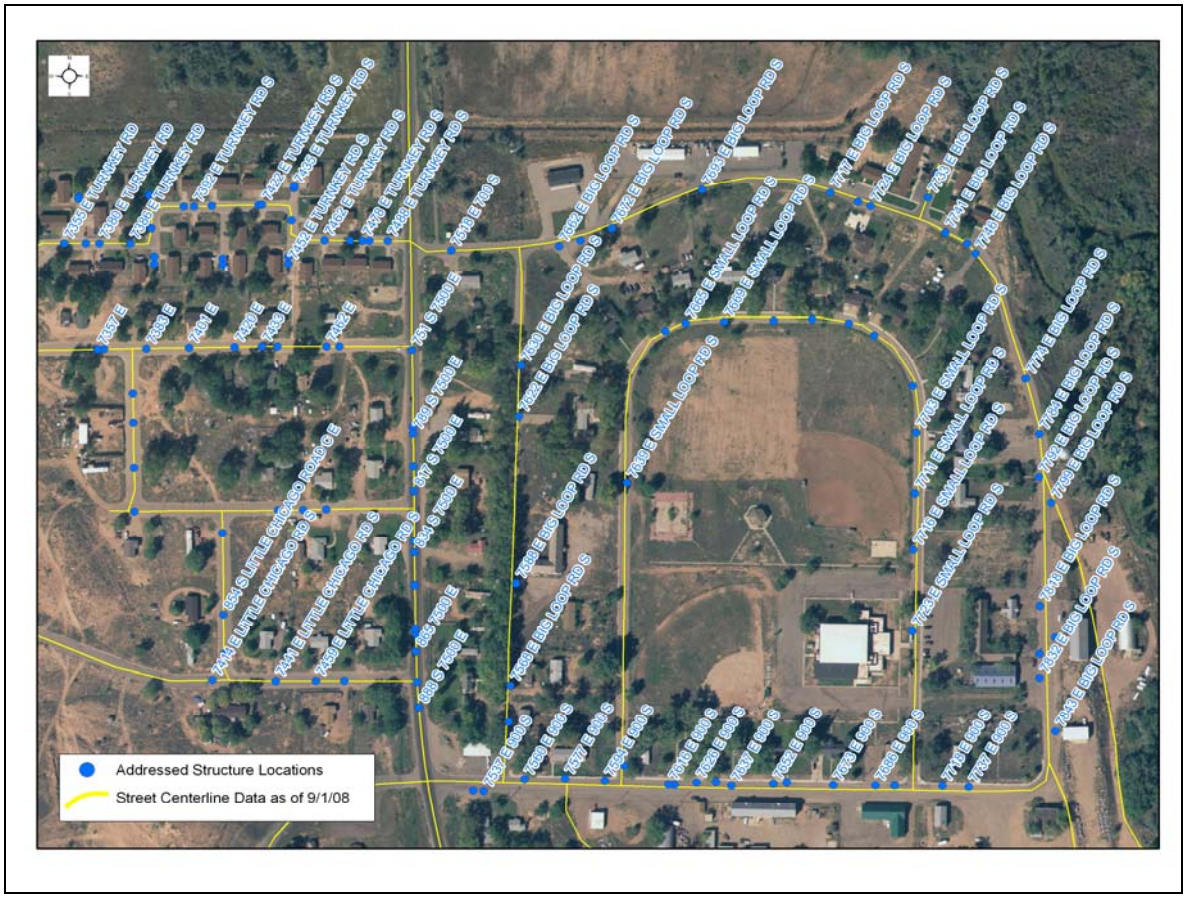
Uintah-Ouray Reservation

2008 Accomplishments:

- AGRC collected approximately 28 miles of GPS street centerlines, digitized 47 miles of street centerlines, and GPS'd approximately 1040 structure locations on the Uintah-Ouray Reservation. Valentino James, GIS Technician, digitized approximately 411 additional structure locations that were integrated into the GIS database.
- Throughout the Uintah-Ouray Reservation, AGRC completed the address calibration process and assigned each structure location a new address in the GIS database.
- Valentino James is currently in the process of verifying road names and gathering the occupant's name of each structure location. When these tasks are complete, AGRC will input the information into the GIS database.
- AGRC digitized and collected the GPS location of oil/gas wells on the Uintah-Ouray Reservation. This information will be a valuable tool to the Uintah Basin Consolidated Dispatch Center in the case of an emergency.



Example #4 shows the street centerlines that existed in the GIS database before and after AGRC began the addressing project for the Uintah-Ouray Tribe. AGRC has since incorporated street names, prefix and suffix directions, and address ranges as part of the address calibration process.



Example #5 shows the structure locations in Fort Duchesne that were either GPS'd or digitized, and the new addresses assigned after the calibration process was completed.

Washington

2008 Accomplishments:

- For the town of Virgin, AGRC generated a new address grid, completed the address calibration process, and assigned each structure location a new address in the GIS database.
- Based on a list of addresses provided by Nancy Lucchetti, Washington County GIS, AGRC populated missing street names and address ranges within the GIS database in the Toquerville area.
- AGRC attributed street names and address ranges within the GIS database in the St. George area. Resources from Dave Evans, St. George GIS, were used for verification.
- AGRC collected GPS street centerlines in the Apple Valley, Hurricane, and Virgin areas. In addition, streets and addresses were field checked in the Hurricane area for verification.
- AGRC digitized structure locations in the Hurricane and Virgin areas to support the addressing effort.
- AGRC is in the process of verifying Apple Valley's address list with the address information in the GIS database. Town officials will need to correct a few street signs in Apple Valley that have incorrect grid coordinate names.

- AGRC compared the GIS data provided by Joe Rhodes, Hurricane GIS, to Washington County's GIS database to identify discrepancies. AGRC met with Joe Rhodes to resolve the issues that were identified.
- As part of an ongoing effort, AGRC will attribute the GIS database with street names, address ranges, and prefix directions throughout the county. Information provided by each municipality and by the Washington County Assessor's Office is used during the process.

Wayne

2008 Accomplishments:

- To support the addressing effort, AGRC digitized and collected GPS street centerlines that were not visible in the aerial imagery. In addition, a total of approximately 1613 structure locations were either digitized or GPS'd.
- AGRC completed the address calibration process in the Bicknell, Caineville, Fishlake, Fremont, Grover, Hanksville, Loa, Lyman, Notom, Sandy Ranch, Teasdale, and Torrey areas, assigned the structure locations a new address, and populated owner name in the GIS database.
- AGRC generated a countywide MSAG from the GIS database and provided it to Jeff Nielson, Richfield Communications Center.
- AGRC digitized and collected GPS locations at each intersection where the new streets signs are to be installed. Wayne County officials installed the new street signs to reflect the new addressing system. AGRC verified the street sign names to ensure they are accurate and consistent with the new address system.
- AGRC provided Cynthia Nielsen, Sevier County GIS, GIS technical support to ensure Wayne County's GIS data (street centerlines and structure locations) are accurate, complete, and consistent.

AGRC E911 Project Summary
September 5, 2008

Services Provided by AGRC in Support of County/PSAP Requests	1. GPS road centerline data collection	2. Field verification & quality assurance on road centerlines to ensure correct & complete address calibration	3. Inspection and quality assurance to ensure correct & complete address calibration	4. Topology (connectivity and contiguity to define and enforce data integrity)	5. Geocoding attributes, quality control and problem reporting	6. Address grid creation and assistance	7. Assistance and design of linear referencing systems	8. Assistance and development of road naming conventions and standards	9. Structure address numbering assistance	10. Assistance with road sign location and style for addressing for E911 purposes	11. Master Street Address Guide (MSAG) generation or assistance	12. Map creation for planning and public meetings	13. Meetings between neighboring counties to reconcile road name differences	
Beaver	X	X	X	X								X		
Box Elder	X	X	X	X								X		
Cache	X	X	X	X	X									
Carbon			X	X								X	X	
Daggett	X	X	X	X	X	X		X		X	X	X	X	
Davis	X		X	X										
Duchesne	X	X	X	X		X			X			X	X	
Emery	X			X								X	X	
Garfield	X	X	X	X	X	X						X	X	
Grand	X	X	X	X	X	X	X				X	X	X	
Iron	X	X	X	X	X							X	X	
Juab	X	X	X	X	X	X					X			
Kane	X	X	X	X	X	X		X	X		X	X	X	
Millard	X	X	X	X	X							X	X	
Morgan	X	X	X	X	X	X								
Navajo Nation	X			X					X			X		
Piute	X	X	X	X	X	X		X	X	X	X	X	X	
Rich	X	X	X	X	X						X	X		
Salt Lake	X	X		X								X		
San Juan	X	X	X	X	X		X	X	X		X	X	X	
Sanpete	X	X	X	X	X	X						X	X	
Sevier	X	X	X	X	X	X		X	X			X	X	
Summit		X		X								X		
Tooele	X	X	X	X										
Uintah	X	X		X	X				X			X	X	
Uintah-Ouray Tribe	X	X	X	X	X	X		X	X			X		
Utah				X								X	X	
Wasatch				X								X	X	
Washington	X	X	X	X	X	X						X	X	
Wayne	X	X	X	X	X	X		X	X	X	X	X	X	
Weber	X		X	X										

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September 5, 2008

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Bountiful City PD				X										
Clearfield City PD				X										
Colorado City	X	X	X	X	X									
HAFB				X										
Layton City PD	X	X	X	X	X									
Orem				X										
Pleasant Grove PD				X										
Provo PD				X										
Salt Lake City PD				X										
Salt Lake TOC				X										
SLCo Sheriff Office				X										
Springville PD				X										
VECC				X										